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Spring 2000 The Voice of the Land Surveyors of California NO. 126

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The California Surveyor

is the quarterly publication of the California Land Surveyors Association, Inc. and is published as a service to the land surveying profession of California. It is mailed to all Licensed Land Surveyors in the State of California as well as to all members of California Land Surveyors Association, Inc. The California Surveyor is an open forum for all Surveyors, with an editorial policy predicated on the preamble to the Articles of Incorporation of the California Land Surveyors Association, Inc. and its stated aims and objectives, which read:

"Recognizing that the true merit of a profession is determined by the value of its services to society, the California Land Surveyors Association does hereby dedicate itself to the promotion and protection of the profession of land surveying as a social and economic influence vital to the welfare of society, community, and state."

"The purpose of this organization is to promote the common good and welfare of its members in their activities in the profession of land surveying, to promote and maintain the highest possible standards of professional ethics and practices, to promote professional uniformity, to promote public faith and dependence in the Land Surveyors and their work."

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CLSA Homepage: http://www.ca-surveyors.org

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ADVERTISING

Commercial advertising is accepted by The California Surveyor. Advertising rates and information can be obtained by contacting CLSA Central Office, P.O. Box 9098, Santa Rosa, CA 95405, (707) 578-6016, Fax (707) 578-4406. Circulation: 4,800.

SUSTAINING MEMBERSHIP

Membership in the California Land Surveyors Association, Inc. as a Sustaining Member is open to any individual, company, or corporation who, by their interest in the land surveying profession, is desirous of supporting the purposes and objectives of this Association. For information regarding Sustaining Membership, contact CLSA Central Office, P.O. Box 9098, Santa Rosa, CA 95405, (707) 578-6016, Fax (707) 578-4406.

EDITORIAL MATERIAL

All articles reports, letters, and contributions are accepted and will be considered for publication regardless of the author's affiliation with the California Land Surveyors Association, Inc. Contributions submitted on floppy diskette medium are encouraged. For compatibility, disks should be 5.25 or 3.5 inch, MSDOS (IBM compatible) format. We can accept ASCII text files or word processor files from the following programs: WordPerfect or Microsoft Word.

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DEADLINE DATES

Spring	January 10, 2000	Summer	April 10, 2000
Fall	July 10, 2000	Winter	October 10, 2000

Articles, reports, letters, etc., received after the above mentioned date will be considered for the next edition.

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On The Cover

CLSA Immediate Past President, Gerald Stayner (right), passing gavel to 2000 President, Michael S. Butcher.

From the Editor

Change, anyone?

By: Phil Danskin, PLS

Was the Y2K fiasco as exciting for you as it was for me? It certainly was good for business . . . Tap lights, batteries, water . . . and other "survivalist" accoutrements . . . Windows is working as crappy as ever. (Is Linux going to make it, or go by the wayside like DOS?) Ennui.

Last October the world held about six billion people. Like the panorama off Interstate 5 of the Harris Ranch stockyards, near Coalinga, our planet has become a virtual human stockyard and the Creator must be sick to his/her stomach at the current state of Earth.

Six billion! Six billion! With the United States population estimated at 230 million - that makes the U.S. 3.8 percent of the world total! Yet, this nation seems to be a nation of "idjuts," (as the late columnist Herb Caen would write), insistent upon using the archaic English Units. England doesn't use it anymore! So why are we? We've gone from varas to chains. Chains to feet and inches. Feet and inches to feet and tenths. And there lies the simplicity. Ten. Metric!

"English is the international language of business. Metric is the international language of measurement!"

Now is our chance to change this 3.8 percent, with their arms around their enamored English-units, like linebacker Dick Butkis' hold upon his opponent's lower extremities. Our profession, (and that of our engineering cousins), has done it in the past and can do it in the future!

Would we like to aid the cause for our nation to be metric by the next millennium? CalTrans has been the leader in this endeavor for nearly a decade! Hats off to CalTrans! With the meter now about two hundred years old, isn't it about time the remaining 3.8% of the population accept the inevitable? Thomas Jefferson and John Quincy Adams understood the merits of the meter and tried to get our country to adopt metrics long ago. In 1893, all standard U.S. measurements were defined in terms of metric units. In 1902, Congressional legislation requiring the federal government to employ metric exclusively, was defeated by a single vote! We're Americans! . . . hanging onto English units. Now there's an oxymoron!

Change for Change

Noel Change was a surveyor, the son of the late Last Change, who was a surveyor and engineer in the Foothills. Noel began surveying with his father when he was old enough to walk. Last Change was one of the founding fathers of the Order of the Foot, which believed surveyors and engineers should use the foot, as the universal unit of measurement, rather than those darned chains. They had no desire to be chained to their jobs. Rather, they booted their profession into thinking feet.

Well, one Monday morning, Noel Change got all spiffed up . . . cleaned the chew and poison oak off his Bibb overalls . . . cause he had an important meetin' with the County Surveyor, I. R. Metric. Ira was goin' on 'bout some damned foreign measurin' stick.

"Probably some British plot to keep the U.S. of A. behind the eightball!" thought Noel Change, as he walked into the County Surveyor's Office.

"I'd like to see Ira Metric," demanded Noel Change of the receptionist Ms. Lotta Miles.

"Mr. Metric, there's a Mr. Noel Change to see you," warned Lotta, on the intercom.

"Ira, you gotta problem with my Parcel Map?" whined Noel, as he stuffed some chew into his mouth through his dog- like teeth and matching breath.

"No, Mr. Change, I don't. But, you are the last surveyor in the County of Foothills that prepares maps in English units," I.R. Metric complained.

"So? It's a free country. I should be able to express myself in any damned units I want! Keep this up Ira, and the next map I prepare will be in fairies . . . Ten fairies to the mile! Now put that in your pipe and smoke it!"

"Now, Noel. Yes, it's a free country. Aren't you aware that metrication is and has been the Law? The Metric

Conversion Act of 1975, as amended by the Omnibus Trade and Competitiveness Act of 1988, (Public Law 100-418), declares that metric system is the preferred system of weights and measures for U.S. trade and commerce. And furthermore, in the last election, I recall seeing a "Bush for President" sign on your trailer."

"So? It's a free country."

"Well Mr. Change, I don't know if you recall, but in 1991, President Bush issued Executive Order 12770 for the metric usage in federal government programs. That means any project receiving federal funds, is to be designed and built in metric units, (or SI = International System of Units)."

"I knowed I should have voted for Perot..."

"Did you know that last October the world held about six billion people? Six billion, Noel, six billion!"

"The United States population is estimated at 230 million - that makes us 3.8 percent of the world total!" Metric explained. "Yet, more than 95% of the world's population employs the metric system! Hell, Noel, England doesn't use English Units anymore! So why should we?"

"'Cause it's un-American, that's why!" groaned Noel.

"No, it's good for U.S. trade, Noel. Did you know that after World War II, America produced more than 95% of the world's products? Now, we produce less than 25%! That is the reason we need to be on the metric system, Noel — international trade and commerce . . . In 1992, the European Union no longer accepted any nonmetric labels on products sold within the EU! On Sunday, October 1, 1995, it became illegal to trade in English units in England!"

"Damned Brits. First our trade, next our guns," growled Change.

Actually, Noel, it is good for commerce. This great country is more metric than you probably realize. All packaging is metric. Didn't you notice those jugs of Mountain Dew in the back of your pickup are two liters? Metric! Your old GM pickup is metric."

"Yeah, and it cost me! I had to go out and buy a metric set of wrenches to work on it!" grumbled Noel.

"And wasn't it easier trying to find a wrench that fit? The 10mm wrench was too small and the 12mm to big — hasta be a 11mm. The SAE equivalent would be like a child's scavenger hunt!"

Metric conveyed.

"Yeah, I suppose that part's easier," Noel confessed.

"And our county is not the only one to be metric, Noel. Contra Costa County began their metric guidelines in January 1996. In the Spring of 1997, Riverside County published the Riverside County Metrication News explaining metrication. Those are not the only examples embracing metrication. Don Synder, of Santa Cruz County, sent the editor of the *California Surveyor*, a metric Record of Survey done by the late great Stanley Smith. The Smith survey was recorded in 1977, (Vol. 64, of Maps, at Page 65, Santa Cruz County Records) - and it was in meters! No wonder they called him the Dean of Santa Cruz County surveyors. The guy was ahead of his time."

"Weren't you in Scouting, Noel?" asked Metric.

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Letters to the Editor

■STORY TIME

I enjoyed reading your article "Story Time !" in the winter 2000 (No.125) issue of *"The California Surveyor"*. If "Homer Owner" lived here in Washington, his surveyor, "Reese Spectable", would have performed the boundary survey, and submitted his Record-of-Survey to the Auditor's Office, along with a filing fee of $50.00 (varies slightly, County to County). In this State, the fee is merely a recording fee, not a checking fee. The entire responsibility of the survey is upon the land surveyor certifying the map. Chances are Homer Owner wouldn't have had to lose his home! For additional information, please check our "Survey Recording Act", the State law being RCW 58.09, which establishes standards and procedures for monumenting and recording a public record of the surveys.

I used to live in California, and am still carrying my PLS license there. During the 1970s, I remember the fuss we had with different counties charging different rates for R/S checking fees. I had hoped it had been resolved. I support the way Washington allows a surveyor to record a survey, keeping the responsibility on the surveyor, and the court to make decisions when a problem arises. Good luck.....I think you're on the right track !!

Respectfully,
John Stuart Lacy, P.L.S.
Spokane, WA

■THE EVOLUTION OF CORNER RECORDS

As the use of corner records, record of surveys and even the Land Surveyors Act itself continue to evolve, we the Professional Surveyor must watch out for the interests of the consumer (our client).

Once upon a time, the record of survey checking fee for all counties in the State of California was ZERO dollars. A recent fee listing, as published in the *CLSA NEWS,* showed the various county surveyors (statewide) checking fees for record of surveys ranging from ZERO to $550. The fee in San Bernardino County, the county in which I reside, is $420. In the meantime, the corner record fees throughout the state range from ZERO to $10.

The corner record was created to fill the need for a short and less expensive method of making survey information available to the public without the necessity of a record of survey. The County Engineers Association of California (CEAC) believes this interpretation of the Professional Land Surveyors Act, as it relates to corner records, as a reasonable approach and in line with the purpose for which the corner record was created (as noted in the Guide to the preparation of record of surveys and Corner records submitted by CEAC and NASE in 1989 and again as revised in June 1993). Originally, the corner record was solely used to show one monument, usually a section corner. As time passed corner records were submitted and accepted showing multiple corners, entire parcels, and ties (or references) to monuments, positions, etc... This extended usage seems to coincide with the introduction of fees for filing of record of surveys by the various county surveyor offices. The corner record should continue to evolve over the years to a document of even greater value to the survey community and the consumer.

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The corner record has even replaced county surveyor and city engineer tie sheets. This is blamed on the fact that the county surveyor (and cty engineers) offices say they have less funds to maintain, tie-out, or re-set centerline monuments and other controlling monuments needed for our mom and pop surveys. Therefore we private surveyors must do these tasks previously done by the county surveyors with the expense being absorbed by the consumer (mom and pop). Needless to say the corner record is an inexpensive way to tie out centerline monuments, although compliance with Section 8762 (LS Act) is questionable when our tie notes state that *"no claim is made as to the relationship of the points shown here on to true boundary locations."*

I believe the Land Surveyors Act allows great flexibility in the preparation of the corner record, recognizes the constraint of the consumers pocketbook and makes allowances to the filing of these documents. This is obvious by the acceptance of corner records throughout the state showing random intersection ties, partial lots, unrecorded lots, assessors lots, moderate discrepancy in measured vs. record data, points on line, parcel splits, accessories, reference points, "additional" right of way and almost any configuration you can imagine that *conforms* to Board Rule #465. Said Rule #465(per 1981AG) allows the surveyor to "omit" filing a record of survey even where the lines are newly established, as long as the newly established lines can be determined by inspection of a map of record without the use of trigonometric calculations. The "standard of care" illustrated by these corner records best reflects the intent of the Land Surveyors Act.

At my local county surveyor's office, political and fiscal problems have forced them to collect more than the $100 record of survey fee as set forth in the Land Surveyors Act. The result of this exorbitant demand is not a better survey or a better record document. Instead the result is often a hardship on the consumer. The $420 county record ofsurvey fee is sometimes more than the lot survey itself. Quite often, the consumer will turn down the record of survey altogether and hire an unlicensed surveyor to set unrecorded corners. Another result is as follows: A property owner calls for an estimate to survey lot 12. The Assessors Map shows he owns two separate tax parcels, the West 1/2 Lot 12 and East 1/2 Lot 12. The licensed surveyor quotes him a price of $350 plus separate $10 county fee check to file a corner record of said Lot 12. The property owner calls back and asks how much to survey just the West 1/2 of Lot 12? Instead of half of the

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"Hell yes, I was a damned good scout," Change said proudly, taking a moment to spit with pride into his coffee can of . . . (yuck!).

"Then you know about the various merit badges, right?"

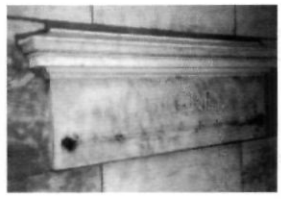
"Yeah, what about merit badges?" hesitated Change.

"If you're a scout trying to obtain a merit badge in Orienteering, you'd better know meters. A scout must hit seven control points over a 3,810 meter course! In cross country orienteering the course can be 1-2 kilometers and consist of 12 to 20 control points," rattled on Ira.

"I had no idea metric was so prevalent," confessed Noel. "Well Ira, you've got me. I've been in this profession for over twenty years. The last time I really dragged my heels, was when the total stations came out. At the time, I thought it was a conspiracy started by Ever Ready or Duracell to become addicted to the battery. I guess it's time to change Change. The way you explained it Ira, you've convinced me that it's UN-AMERICAN not to be on the metric system. Heck, I'm gonna buy a metric drafting scale and go metric. It may not be too late to teach this dog new tricks."

"Glad you have an open mind, Noel," grinned the relieved county surveyor.

Six months later . . .



I.R. Metric received a post card from Noel Change in the south of France. It was a picture of a meter - literally. And printed on the back was: "Ira, you were right. The meter is omnipresent! Heck, I don't even have to learn a foreign language, 'cept English. Everywhere my dog and I go, they speak perfect English. It's our

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A Brief History of Land Surveying

Part 1

By: Michael J. Pallamary, PLS

Dating to the earliest civilizations of Egypt (4500 BC) and Babylon (2100 - 689 BC), there is ample evidence of the application of simple land surveying techniques. On the wall located in the tomb of one Menna at Thebes, there exists a representation of two early surveyors laying out a large field of corn. In Ptolemaic and Roman papyri, notations regarding measurements of plots of land can also be found. The *Encyclopedia Britannica* notes " . . . the early Egyptians could carry out measurements with a considerable degree of accuracy is certain from a study of the dimensions of the Great Pyramid. Since approximately 3000 BC., the earliest of maps and registers which have survived were prepared utilizing very simple and primitive surveying methods and equipment."

The Egyptians used a simple measuring device made of rope which was knotted at standard intervals. The Romans developed another simple surveying device known as a *groma.* Ancient engineers used this crude instrument to establish a straight line as well as a line set at right angles in the field. The groma consisted of two center ribs of date palm lashed together at right angles with palm fiber, four bobs of limestone attached to plumb lines were used as the basis for the sighting. By holding the groma in front of himself at eye level, the Roman surveyor would sight a known line or point through the opposite bobs and when aligned, the intended lines could be laid out. This ability aided in the engineering of early roads, many of which exist today. During the excavation of Pompeii in 1912, archeologists discovered remnants of an intact groma further attesting to early Roman engineering skills.

The groma succeeded the *Grecian Star,* an instrument used by early surveyors and used by Hero of Alexandria. Hero is also credited with inventing the water level, the leveling rod, and the *dioptra,* a device which could be used as either a level or as a crude surveyor's transit. As the Greek civilization flourished, so too did the science of land surveying, primarily because of the astonishing progress made in higher mathematics.

Following the death of Alexander the Great (323 BC), the Hellenistic period that is most closely associated with the development of practical surveying. In addition to the influences of Hero, Eratosthenes (276-196 BC.) made valuable contributions in the determination of the size and circumference of the earth, a concept later to influence the explorer Christopher Columbus.

"The earth is given as a common stock for man to labor and live on."
— Thomas Jefferson

The Romans, renowned for their road, aqueduct, and tunnel construction, extensively used higher levels of surveying and engineering. Although not credited with creating any significant scientific surveying instruments, they did, nonetheless, employ a considerable amount of innovative techniques to construct their impressive empire. Perhaps the most ambitious survey project of the early Romans is their compilation of a map of their empire. Originally proposed by Caesar, Roman surveyors completed this incredibly accurate document during the reign of Augustus (63 BC - 14 AD).

Later, during the Han Dynasty (202 BC - 220 AD), Chinese engineers made significant progress in their surveying skills. Following the decline of the Roman Empire, it was not until the Middle Ages (476 AD - 1450 AD) before any significant scientific surveying advances were made, and by the end of the fourteenth century several new instruments had been developed. These included the *astrolabe,* the *geometric square,* the *quadrant,* the *Jacob's staff,* and the magnetic compass. Today, the compass is the only instrument remaining in contemporary use.

During the medieval period, the feudal system evolved, and lacking private subdivisions, the field of surveying stagnated. Because of the feudal system, estates were so large that precise boundaries were not of practical con-

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language that is international, not our measurements! See ya soon. Metrically yours, Change-to-the-meter!"

Metric federal works projects have had little problem converting, save, those projects where dual units were involved. So . . . if you're going metric . . . go all out metric. No dual units! Before long, you will see our country "fluent" in metrics. Our grandchildren will thank us for not having to deal with Least Common Denominators in the Twilight Zone of Fractions.

Why not make this year, the year to learn metrics? Set a goal . . . 2001 (next millennium) to be 100% metric! All descriptions, subdivisions and surveys . . . in meters. Descriptions were the impetus to the acceptance of feet in our previous territory of chains. Let's lead our nation into the 21st Century as a metric nation.

Smokey also says, "Only you can protect our forests from English Units."

From Vegas . . .

For those not in the choir - you missed another wonderful conference in the surreal land of Las Vegas! A little Vegas goes a long way. As I do not enjoy "gaming," the architectural marvels were the highlight of the evenings. Watching Bellagio's outdoor light and fountain show, in concert with the opera sounds were beyond words.

Among other things, another reason for professional development and/or college is a more "rounded" education (although if I become any 'rounder' my width will exceed my height). To be honest, I thought I would "coast" a little by attending Dr. Dan McAllister's "Leading a Motivated Work Team" and "How to make a Better Decision." Wow, learning some psychology from Dr. Dan was another highlight of my trip! Fascinating. Entertaining. Educational. As much fun as the roller coaster at New York, New York!

Another highlight was the lectures given by Jerry Broadus, PLS/Esq. and Dennis Mouland, PLS. If you thought you had a handle on boundary control and legal principals . . . some of that went out the window upon learning some interesting cases Broadus shared.

CORS/GIS and surveying politics were discussed in depth. To sound like a broken record, those that did not attend missed a real deal. Those that did not attend should make an effort, at any cost, to attend next year's ACSM/CLSA/NALS/WFPS 2001 conference to be held in Las Vegas. Las Vegas will probably be the closest an ACSM national conference will ever be to California (save, California, of course). So don't miss next year's conference!

It is time to give thanks. Thanks to the efforts of the Conference Committee members, it was another memorable one. Thanks goes to Dorothy and Crissy who worked with fervor and stress to get the job done. And last, but not least, kudos to the students from Fresno State and Community College of Southern Nevada for their help. These young men and women were neither seen nor heard, but their actions were omnipresent. On behalf of our cousins in California and Nevada — a sincere thank you to those that assisted and attended in making this a fruitful conference.

And let us congratulate Terry McHenry, the brilliant editor of The Nevada Traverse, for winning the 1999 Excellence in Journalism award, presented by ACSM/NSPS! Kudos to our easterly cousin!

❖

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cern. Mountains, rivers, lakes and even trees provided adequate monuments for locating and describing large parcels of land. This crude system of land descriptions laid the foundation for a host of problems to follow.

As the Middle Ages ended, and as the Renaissance began (1400 - 1600), progress was made once again in both surveying technique and instrumentation. With the introduction of triangulation in the sixteenth century, the science of *cartography* or mapmaking realized great advances. By establishing a precise network of triangles and by applying trigonometric calculations, the relative distances and directions of the lines could be accurately established. The first *altazimuth theodolite* appeared at this time, making way for a technique that revolutionized surveying. This new process brought together the physical relationship between distant countries and civilizations.

During this extraordinary period, the determination of latitude became possible by observing the height of the sun or selected stars. Using astrolabes and similar instruments, the mysteries of the heavens were reduced to tools for man's scientific arsenal. Because of the complex mathematics associated with the determination of longitude, field calculations proved to be a task of considerable difficulty. The procedure for such measurements involved determining the difference between the local time of observation and the standard time at a place of known longitude such as the Royal Greenwich Observatory. The primary developmental problem impeding the development of this procedure involved the lack of an accurate time keeping device with which to correlate the readings. In 1657, The Dutch astronomer Christian Huygens solved this problem when he invented the *pendulum clock.*

The Renaissance produced the *plane table* and *sight rule,* devices which minimized complex and lengthy mathematical calculations previously required for the preparation of a simple topographic survey map. As methodology developed, modern surveyors compiled their maps by performing a series of observations with a transit and a surveyor's chain. As the surveyor made the readings, the data was recorded in field books upon completion, the surveyor de-

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ciphered the information, producing a survey map as his product.

The plane table enjoyed great success as it allowed the surveyor to draft his readings immediately in the field, thus saving considerable time. By sighting along a straight edge, equipped with crude optical sites, the plane table was used to measure the earth's features and the readings were instantly reduced to any desired scale on the planetable map.

As the feudal system dissolved, the demands for accurate surveys grew as the once vast estates were subdivided into smaller tracts of land. Concurrently, the military played an important role in the development of surveying practices. As the use of artillery blossomed in the sixteenth century, so too were the instruments related to this form of modern warfare. A burgeoning maritime trade hastened the development of astronomical instruments as the necessity to establish true courses for navigation and reckoning positions at sea became critical. This demand also led to a great deal of nautical travel for both commercial and military purposes.

In 1512, Martin Waldseemuller published his illustrated work *Polimetrum.* Therein he outlined the principles employed in the construction of this complex surveying device. Islamic instruments based on the same principle were used even earlier. Clearly the necessity to measure angles both horizontally and vertically increased in importance. History itself is unclear as to who actually developed the circumventer, but it is believed that in the first half of the sixteenth century, Gemna Frisius can take credit for this marvelous invention. Utilizing sights and circular scales, the surveyor used the circumventer to measure both horizontal and vertical angles. The perimeter of this magnificent instrument was engraved with a precise vernier scale allowing for extremely accurate readings of angles.

Danfrie, in 1597, published the details of the *graphometer,* a circumferentor equipped with a semicircular scale as opposed to the conventional full circular scale. Owing to its simplistic design, the graphometer gained considerable popularity among early day surveyors and many were still being made in the early part of the nineteenth century even though the more sophisticated theodolites were readily available. One of the more unique features of the graphometer was the fact that the semicircular scale, complete with the fixed and movable sights, could be easily detached and used as a protractor for plotting angles in the field. While on the reverse side, the instrument contained a simple quadrant clinometer, a scale for measuring inclination.

The seventeenth century produced many talented surveyors including notables John Norden and Aaron Rathborne. Norden is best known for his contribution of valuable written works to English surveying practice. Rathborne also developed the use of the *field book* and the *decimal chain.*

In 1615, Willebrord Snell, the Dutch mathematician, measured an arc of meridian by instrumental triangulation. Five years later Edmund Gunter invented the surveying chain which eventually became the basic unit of measurement for lands in the United States. Named after its inventor, the Gunter chain was devised to measure land area. Equivalent in length to four poles or 22 yards, the chain was constructed such that simple measurements would yield the acreage of the area in question.

In 1631 Pierre Vernier developed the invention bearing his name and still in use today. This remarkable instrument allowed for the precise reading of scale dimensions, thus allowing for extremely refined and accurate measurements on the applicable scale. The telescope and ancillary equipment evolved during this period in the form of cross hairs and the micrometer eyepiece while the *surveyor's quadrant* came into use. Employing a quarter-circle arc, the device was favored by astronomers eager to record the altitude of the stars and planets. To adapt to the needs of the surveyor, the quadrant was refined and incorporated into a smaller device.

Centuries earlier, *Hero of Alexandria* and *Marcus Vitruvius,* ,the First century Roman Architect and Engineer described water levels, devices used to determine horizontal directions by reference to the surface of still water. In 1666, *Thevenot* invented the spirit level and this ancient idea was put into practice.

In simplest terms, the spirit level is an extension of the common carpenter's level in which refined sights are constructed so as to allow a user to sight along the level line established by the instrument. The viewer could thus determine relative elevations along the surface of the earth. Prior to the introduction of the spirit level, early surveyors used a balance level for rough leveling. Utilizing a lead tube suspended by a thread, the device was attached to a wooden case. Windows at either end allowed clear view-

Continued on page 23

CLSA / NALS 2000 Conference

By: Steven C. Wilson, PLS

Imagine a land surveyor's conference held during Valentine's Day in Las Vegas! It was estimated that 6000 people were in Las Vegas to be married. The local news stated that the line for a marriage license extended outside the courthouse door and around the block. From February 13 through 17, 2000, nearly 600 attendees, spouses and vendors gathered at the Tropicana Resort & Casino in Las Vegas for our annual conference. Although there were weddings at the Tropicana, we don't know if any of the conference attendees got married during the conference.

The conference began on Sunday with CLSA President Michael Butcher, PLS, and Brett Jefferson, PLS, NALS President, introducing each association's officers. Proclamations from the Governors of California and Nevada were read, each proclaiming the week of February 13 through 19, 2000 as Land Surveyor's Week. Opening remarks were made by Rita Lumos, PLS, ACSM Area Director. Curt Sumner, PLS, ACSM Executive Director, gave a very thought provoking Keynote Address.

Jerry Broadus, esq. and Dennis Mouland, PLS presented several technical sessions about Local Corners in the Public Lands Survey System and Bona Fide Rights, Courtroom Procedures, Finding the Law, and Restoration of Lost Corners. Concurrently a session was given by Curt Sumner on Client Relations. Other sessions included Continuously Operating Reference Stations (CORS), Crustal Motion, and using GPS Base Station data for survey operations in Las Vegas Valley. Concurrent sessions were also given about Leading a Motivated Work Team, How to make a Better Decision, and Transferring Best Practices to your Own Company, Crisis Management and Chaos Theory.

The Monday luncheon speaker was John Wesley Powell, portrayed by Clay Jenkinson, who is the nation's leading interpreter of historical characters. John Westley Powell was a one-armed Civil War Veteran who had the adventure of exploring the Grand Canyon of the Colorado River in 1869. He was a visionary of the taming of the west, and to giving life to the arid west. This was a very informative and interesting look at what life must have been like 130 years ago. Quite a change from the glitter and excesses just outside.

Oscar Goodman, the infamous Mayor of Las Vegas was our Tuesday luncheon speaker. Mr. Goodman is also an accomplished criminal defense lawyer who had the distinction of representing some of the more colorful persons in Las Vegas' past. Perhaps more politically correct stated as: "defending the constitutional rights of all citizens". Las Vegas is blessed with a very articulate, entertaining and well-informed mayor; it was a pleasure to listen to his presentation.

There was a panel discussion about the Surveyor and GIS, with perspectives given from each side of the current issue, the California Board of Registration, and the evolving work of the Task Force on the NCEES Model Law. Closing Ceremonies included the Grand Prize drawing of a Digital Camera. The conference was followed by a 2-day workshop. One day was devoted to Water Boundaries for Surveyors, the other day was an Advanced BLM Cadastral Workshop.

The main evening event of the Conference was the Scholarship Auction. Items were donated by most of the 31 vendors present and from many of the conference attendees and other donors. Over $23,000 was raised to fund future Scholarships. This was shared by the CLSA Education Foundation, and by NALS for the benefit of surveying education. The value of those "closet items" that dwell in everyone's surveying business or office is incredible. Think about donations for next year's conference. Your donation will do more than you can imagine.

This conference would not have been possible except for the hard work and dedication of CLSA and NALS. Much needed help was cheerfully offered by the twelve University Students present. Special thanks are due to the Conference Committee, and especially to Crissy Willson from the CLSA Central Office. Conference Co-Chairs were Dorothy Calegari and Jim Stacy. Program Chairmen were Don D'Onofrio, Jim Stacy and Steve Wilson. Exhibits Chairmen were Marty Crook and Mike Welch. Ryan Cook was the Student Coordinator.

Next year's conference will be in Las Vegas during March 2001. It will be even bigger and better as a national event with the added participation of WestFed and ACSM. ❖

CLSA/NALS Conference 2000

Congratulations Steve & Frank!

Steve Wilson, PLS
Member of the Year

Frank Demling, PLS
Distinguish Service Award

Thank you students!

Back row L-R: Shawn Dyer, Ben Bardakjian, Anne Minney, Blaine Caldwell. Front row L-R: Dan Gregory, Tim Lackey, Gage Fleming, Jon Franz, Joe Sullivan(all from CSU Fresno). Not pictured: Brad LeFleur and Keith Johnson both of the Community College of Southern Nevada; Courtney Faulkenberry and Aaron Fowler both of CSU Fresno.

CLSA 2000 Officers

L-R: Pat Tami, Vice President; Mike Butcher, President; Marc R. Van Zuuk, Secretary; Ray Mathe, Treasurer

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07511	Carol Emilia Morales-Burnha	Pacifica
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07513	Patrick Henry Clemons	Thousand Oaks
07514	Michael King Reed	Porterville
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07517	Kyle G. Esgate	Riverside
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07519	Curtis C. Stephens	Moreno Valley
07520	David Wayne Lanphear	Stockton
07521	Bryan Patrick Bonino	Woodland
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07540	Daniel Joseph Walsh	Camarillo
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07542	Timothy Scott Fettig	Laguna Niguel
07543	Benoit A.V.J. McVeigh	Pleasant Hill
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07545	Eric Scott Gilbertsen	Covina
07546	Jaime A. Satalich	San Pedro
07547	Brett Johnson Chappell	Gilroy
07548	Jon Michael Crisp	Corona
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Any CLSA Chapter would love for any licensees to attend a Chapter meeting and/or function. Call Central Office at (707) 578-6016 or e-mail, Phil Danskin, at geometre@vom.com to obtain the time and place of a Chapter meeting nearest you. ❖

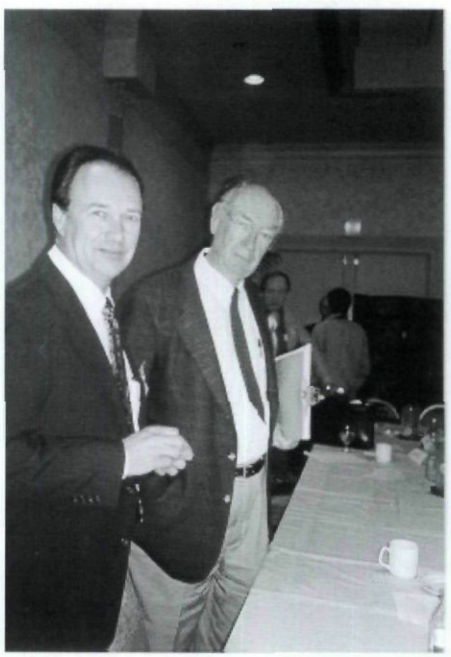
Letter to the Editor -continued from page 9

whole lot price, the licensed surveyor quotes $660 plus a separate $420 check to the county to a file record of survey. This price is three times higher (mostly county fees) than a full lot survey? Said property owner opts for the full lot survey and owner sets his midway points himself. Is this the intent of the Land Surveyors Act? I don't think so. Who protects the consumer from unduly restrictive interpretations of the Land Surveyors Act and excessive county fees?

It seems that the State Legislation presents Bills annually to revise Section 8762 of the LS Act to make it simpler, reduce county liability and hopefully reduce the fees to file records of survey and corner records. Recently, a new type of document, the "no fee" Survey Plat was introduced. I believe that evolution has already corrected this issue. This is why the use of corner records has expanded and should continue to do so. The county surveyors statewide must accept the corner record "standard of care" as submitted by many professionals and be more flexible (use common sense, and show concern for the consumers dollars and cents) in their interpretation of the Land Surveyors Act. The 1981 California Attorney Generals Opinion No. 81-103 needs to be appealed and updated to be in harmony with the intent of the LS Act and the "standard of care" exercised by today's professional practitioners. During the last eighteen years, we have watched some county surveyors unfairly charge the consumers (mom and pop) an exorbitant fee for records of survey. We all accept the fact that the record of survey has its place, i.e... major discrepancies, certificate of compliance, complicated surveys, alternate positions, court cases, etc... However, I must speak for the masses and pray that the Attorney General and the Board of Registration realize that the corner record has evolved to a point where it publicly documents and protects the interests of the consumer (in many cases equal to a record of survey). To force the consumer to absorb the cost to duplicate a corner record with a record of survey is unjust. ❖

Paul Christopher Ehe, PLS 5280

Old Timers' Corner



CLSA Past President, Steve Wilson with Richard Hogan, CLSA's first President

The Speed of Light and Other Superlatives

By: R. Lee McComb, PLS

Anyone into superlatives has loved 1999, the year we debated the greatest and the best, not only from the immediate past century but the millennium it concluded.

From sports to politics, science to religion, the famous and infamous have been revisited everywhere in the media. A list of the 100 most important people of the last thousand years, as selected by a panel of historians, scientists and popular voting was seen recently on one cable television channel and comprised an extremely divergent set of persons, ranging from the universally agreed-upon preeminence of Newton, Ghandi and Gutenberg to larger than life media creations like Elvis Presley, the Beatles, and Bill Gates.

What surveyors could list as their superlatives for the last thousand years might call an impressive roll of individuals who shaped our science and profession, and certainly might include pivotal historical events if not whole political movements. But in hacking through to our landmarks of the last millennium, I found it difficult to choose a path to some of the more obvious milestones: the inception of private property rights near the end of the Middle Ages, the invention of accurate clocks to solve the problem of longitude, and the surveyor as guide to the colonization of the new world; or, to favor a less-brushed trail to underrated monuments historians often overlook: land apportionment as a means for democratizing the newly formed United States; the science of statistics as a spin-off of surveying; the role of fixed international boundaries in an otherwise uncertain world; and, the biggest find of all, the discovery that light travels at a finite speed.

The Second Millennium was generally a good one for surveyors. The three principal surveying disciplines we now recognize arose; military, geodetic, and cadastral, in that order of importance to the countries they served. By the 17th century, each of these disciplines had advanced to reliably quantifiable sciences and, as recognized scientists, surveyors began climbing the social ladder to positions of rank and title. King Louis XIV's keen interest in surveying financed a renaissance in the subject that began in

his France, which soon produced the first instruments to measure the arc-second and the first device to measure the time it takes light to travel to a mountaintop and back. Competing with the French surveying revolutionaries were the English geodesists, who two hundred years ago initiated the modern age of surveying with a power of ten improvement in the theodolite circle and the angular techniques to go with it; these remained the standards of the science until the invention within the last 50 years of the EDM, the end-product of the determination of the finite speed of light. All of these advances had a common root and result: they each came out of, and were each reinvested into, the Age of Exploration, that single most important happening of the millennium. The development of the new world is the legacy of surveying within the Second Millennium.

In our own American history, this legacy is no less important. It has come down to all professional surveyors, including our own work in California, by way of our surveying forefathers who happen also to have been the two most celebrated founding fathers of our country. Washington and Jefferson are political superlatives an order of magnitude higher than any other political figures in American history, save Lincoln. But, whereas Lincoln as a surveyor is treated anecdotally, if at all, by historians, Washington and especially Jefferson are immediately recognized as surveyors because of whose professional surveying backgrounds we have a foundation of individual liberties, egalitarian in principle, to acquire and apportion real property. Our first and third presidents fostered a land culture based upon this foundation, the steady maintenance of which ever since has been the job of the professional surveyor. Out of Jefferson's apportionment ideas sprang the logic of the sectionalized land system as well as the concept of forming so-called free states (at least in Jefferson's time), and to further subdivide below those states into a pattern of decentralized jurisdictions we know as counties and cities. With Jefferson there had never been before, and will likely never be again, such a grounded respect for the logical apportionment of land, consistent with egalitarian principles, among a people.

In assessing the impact of people and events of the millennium, it helps to put into perspective the technological advancements during the most recent thirty years. These naturally tend to overshadow, but the future historical impact of this technology cannot be assessed until the changes it will bring are effected. For example, until we know the future, it would be premature to make today's fantastic timekeepers more important than, say, Jupiter's moons once were as a universal clock. In fact, the clocks that drive today's GPS systems have accuracies millions of times better than celestial angles ever did, or were possible with Harrison's beautiful clocks which solved the problem of longitude. We should not forget that the machined circle, invented over three hundred years ago, gave the theodolite the first portable means of determining global position, and this counted more in its day than GPS has so far counted today. From a purely technical point of

Continued on page 29

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Brief History - continued from page 14

ing along the sights. Due to the inability to adjust to a true horizontal sight, as well as the sensitivity of the tube, this instrument was eventually outdated.

In 1674, the Italian Jacob Lusuerg developed a quadrant equipped with a vernier. The device allowed surveyors to measure relative angles to within an accuracy of one minute of arc, a tolerance previously unattainable. This precise measuring capability would soon prove invaluable in the development of artillery aiming and reconnaissance, thus making an invaluable contribution to military warfare.

During this period, the English made further advances in mathematics and trigonometry, thus enhancing the capabilities of the surveying community. Logarithms, a new system of mathematics, eliminated the lengthy and redundant calculations performed by the surveyor. Land location became more important as European cities flourished and agricultural practices changed. Fortunately, access to higher mathematics in the universities led to more individuals being qualified to enter the surveying profession.

During the early eighteenth century, continuing military influences contributed to the development of surveying when Czar Peter The Great and his troops engaged in battles advancing from the Sea of Azor to the Baltic and to Poland to the east. His lack of knowledge of the terrain contributed to many defeats of the Czar's faltering troops. Subsequently, in 1720, Peter ordered surveyors to prepare maps with districts being assigned. His plan proved so successful that Napoleon, the Prussians, and the United States all adopted this policy of creating maps for military purposes.

In the United States, recognizing the need to formally develop a mapping program, Congress established the Corps of Topographical Engineers. This branch of thegovernment was responsible for much of the exploratory work conducted in the American West before the Civil War. Before its abolishment in 1863, there were many noted explorers attached to the Topographical Engineers. These included John C. Fremont, Stephen H. Long, John W. Gunnison, Howard Stansbury and Gouverneur K. Warren. ❖

Mr. Pallamary is the Associate Vice President and Director of Surveying and Mapping for P & D Consultants, Inc., San Diego, CA. He is also noted author and lecturer.

Grenville Dodge & the Survey of the Transcontinental Railroad

By: Kevin D. Burgess, PLS

The Indians called him "Level Eye," a nickname derived from a practiced eye for the lay of the land that served him well as both a surveyor and a military strategist. He was solemn and swarthy, of medium height and wore a full beard during his military days. He walked stoop-shouldered from days spent over a plane table or drafting board. Given to stubbornness, he could be accused of lacking tact, but never of lacking courage or determination. As Colonel of the 4th Iowa Cavalry at the Battle of Pea Ridge, Arkansas, he had three horses shot from under him, but remained in command despite a serious wound. His regiment fought doggedly to hold the Union lines on the first day as the rebels pushed in from all sides. The Union troops revived on the second day of the battle and drove the Confederates from the field preserving Missouri and Northern Arkansas for the Union. A month later he was promoted to Brigadier General for his performance at Pea Ridge. Grenville Dodge would serve in many roles in American history, including Indian Fighter, Major General and United States Congressman, but perhaps his most important contribution to the country was as the man who surveyed the route for the Union Pacific Railroad connecting East to West with a transcontinental railroad.

"Each of our surveying parties consisted of a chief, two assistants, rodmen, flagmen and chainmen as well as axe men, teamsters and herders. When the party was expected to live upon the game of the country a hunter was added. When operating in hostile country they were regularly drilled, though after the Civil War this was unnecessary, as most of them had been in the army. Each party entering a country occupied by hostile Indians was generally furnished a military escort of from ten men to a company under a competent officer. In the field the escort usually occupied prominent hills commanding the territory in which the work was to be done, so as to head off attack by the Indians. Notwithstanding this protection, the parties were often attacked, their chief or some of their men killed and wounded and their stock run off."

Grenville M. Dodge from
"How we Built the Union Pacific"

The survey of the transcontinental railroad was truly a remarkable feat. The survey parties worked in isolation far ahead of the construction outfits. They worked in difficult terrain, in the presence of hostile Indians and far from any communication from the outside. Probably of even greater concern than the Indians was death by disease or accident. It wasn't merely a matter of running a line from East to West. The line had to be

Continued on page 28

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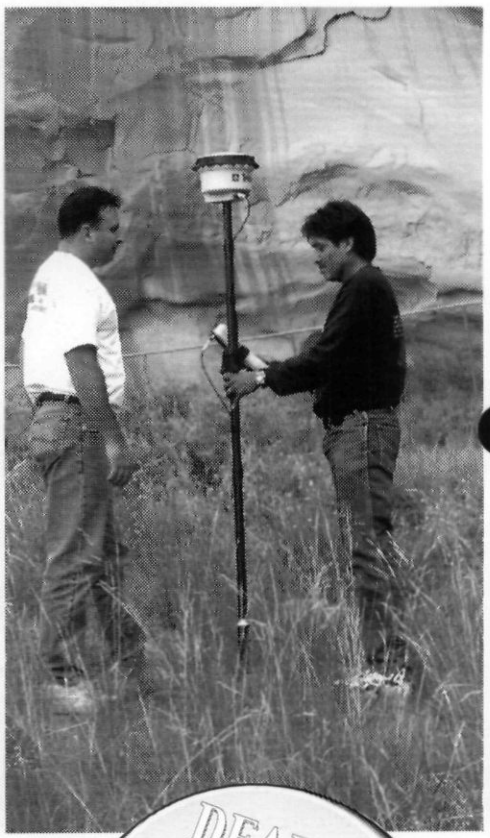

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- **Open to all NSPS Governors.**
- **Contest began at the close of the NSPS Board of Governors Meeting in Grand Rapids, Michigan, October 17, 1999.**
- **Contest ends at the beginning of the NSPS Board of Governors Meeting in the Fall of 2000.**
- **To qualify, the Governor's name must appear in the sponsor's space on a new member's application.**
- **Application must be for full membership and dues must be paid-in-full.**
- **A Governor must sign up a minimum of ten (10) new members to qualify.**
- **The decision of the ACSM/NSPS Membership Committee is final.**

NSPS BOARD OF DIRECTORS CONTEST - $1,100.00 PRIZE

- **Open to all ACSM Members.**
- **Contest began at the close of the NSPS Board of Directors Meeting in Grand Rapids, Michigan, October 19, 1999.**
- **Contest ends at the beginning of the NSPS Board of Directors Meeting in the Fall of 2000.**
- **To qualify, the ACSM Member's name must appear in the sponsor's space on a new member's application.**
- **Application must be for full membership and dues must be paid-in-full.**
- **A Member must sign up a minimum of ten (10) new members to qualify.**
- **The decision of the ACSM/NSPS Membership Committee is final.**

Prize money was donated by individual ACSM Members.
Membership applications can be downloaded from the ACSM Web Site at:
http://www.survmap.org/member40/member03.htm

Grenville Dodge - continued from page 24

chosen so that a suitable grade could be obtained over mountain passes as high as 8,000 feet. The Union Pacific surveyors were limited by law to a maximum gradient of 116 feet per mile. For preliminary surveys in open country, a party was expected to run from 8 to 12 miles a day and on location work an average of 3 to 4 miles a day was run. The chief, besides being responsible for the work, was also responsible for the welfare of the party and often reconnoitered well in front of the party in search of the best possible route.

Grenville Dodge worked on the survey of the transcontinental railroad over a period of 17 years, beginning as a surveyor's assistant in 1853 for the first explorations across Iowa and ending when the final spike was driven, connecting the Union Pacific and Central Pacific tracks at Promontory Point, Utah in 1869. In the 1850's Dodge was hired to work under the tutelage of Peter Dey, a fine surveyor and honest man from whom Dodge would gather much of the experience and expertise he would use in the survey of the Union Pacific tracks in the 1860's. Dodge and Dey worked for the Mississippi and Missouri Railroad under the direction of Thomas Durant. Durant was a crooked financier who would later form the Credit Mobilier and conspire to rob the coffers of the Union Pacific Railroad, driving it to the brink of financial ruin. However if Durant was a crook, he was also a visionary and he began to privately finance the surveys for a railroad that many men thought couldn't be built. Dodge and Dey pushed out across the western frontier into Iowa and the Nebraska Territory making surveys that would later be the basis of the Union Pacific's road some years later.

The Civil War beginning in 1861 interrupted Dodge's railroad work. He continued in military service until 1866 when he resigned his commission to take charge of the Union Pacific construction. He began the war as a Cavalry Colonel but was promoted to Brigadier General for bravery in action in the defense of Elkhorn Tavern at the Battle of Pea Ridge, Arkansas. He then moved east with Sherman and took charge of the reconstruction of railroads and bridges destroyed by the retreating rebels during the Atlanta campaign. Wounded again, he recuperated in Washington and counseled Lincoln on his proposed route for the transcontinental railroad. In 1862, congress had passed a bill forming the Union Pacific Railroad with the intention of building the road to the West Coast. Dodge shared with Lincoln information gathered from his surveys during the 1850s and Lincoln chose Dodge's route fixing the terminus of the road at Omaha, Nebraska Territory. Dodge finished his military career as the Commander of the Department of the West, a department that included the states and territories he would soon build a railroad across.

Soon after the Union Pacific was formed, Dodge's old boss Thomas Durant manipulated the stock of the railroad by buying a controlling interest in the names of his friends. Durant and his cronies threw out the honest officers of the company and took control of all the railroad's operations. They formed the Credit Mobilier to construct the line and in effect the Credit Mobilier controlled by Durant contracted with the Union Pacific, also controlled by Durant to build the road. The Credit Mobilier was presenting grossly inflated construction claims to the Union Pacific and Durant and his friends were pocketing the difference, leaving the honest stockholders of the Union Pacific wanting. Dodge's old friend and mentor Peter Dey had been in charge of the Union Pacific's construction during the Civil War, but he was quite aware of Durant's actions and quit in disgust in 1866. Durant remembered Dodge's abilities and offered him the outrageous sum of $10,000 a year to come on board. He also promised to throw in 100 shares of Credit Mobilier stock; a promise Durant promptly forgot once Dodge was on the job.

Dodge formed the construction of the road along military lines and soon had the operation clicking at a much faster pace. In the spring of 1867 he left the construction of the railroad and led an expedition west to locate the route through the Rocky Mountains. Dodge had found a pass through the mountains during his Powder River Campaign of 1865 and surveyed the line to pass through a new town, named by Dodge as Cheyenne, Wyoming. Cheyenne was chosen as the site of a roundhouse and repair facility and was the most convenient site for a branch line to the small city of Denver, Colorado.

After the survey of 1867, Dodge left for Washington D.C. to serve as a United States Congressman. Durant had become disgusted with Dodge's unwillingness to facilitate his schemes. With Dodge absent he now had his chance. The U.S. Government paid the Credit Mobilier for mileage of track laid. So, of course the more mileage, the more money the Credit Mobilier and Durant made. Dodge was an efficient and practical man and surveyed his lines to find the best and most economical route for the track, something that wasn't in the best interest of Durant's schemes. With Dodge gone, Durant moved in and had new lines surveyed, increasing the mileage of track. He also had the repair facility designated for Cheyenne changed to Laramie and quickly bought up the land in the area, platting it and selling the land for outrageous prices.

Dodge soon learned of Durant's maneuvers and packed his bags and traveled west for a showdown with Durant. Dodge arrived in Cheyenne and immediately began countermanding Durant's orders. He then proceeded to Laramie where he found Durant on the street and in plain English told him that he would make decisions on the location of the line. Durant reportedly said nothing. The feud wasn't officially settled until a conference led by Generals Grant, Sherman and Sheridan met at Fort Sands a few months later. Durant contacted Grant before the meeting and asked for his help in ousting Dodge. Grant refused and the council was held. Durant opened the proceedings by accusing Dodge of running poor and inefficient lines of location for the railroad. We can imagine the smoke coming out of Dodge's ears when he stood and said, "If Durant or anyone with the Federal Government changes my lines, I will quit the road." The room was quiet for several minutes and Grant replied, " The U.S. Government expects the Union Pacific to meet its obligations and it expects Mr. Dodge to remain in control of the location of the line." Durant was a smart crook and he knew the odds were against him. Grant was the Commanding General of the U.S. Army and was expected to be elected as the next president. Durant acquiesced and Dodge remained with the Union Pacific until the final spike was driven.

Like Durant, many of the characters in the building of the road were not humanitarians, but the road did serve a humanitarian interest. It carried both the wealthy aristocrat and the poor immigrant. They traveled in different styles of course but it served both their interests and helped open the west to those who didn't have a chance elsewhere. ❖

Speed of Light - continued from page 21

view, precise angle measurement had a far greater impact on science, culture and economics of the Second Millennium because it coincided with and abetted the development of the new world than the radio trilateration of GPS has so far initiated. But GPS is advancing quickly, and when perfected within the next twenty to thirty years it will have achieved fathomless importance.

I would not want to state unequivocally who or what was the most important person or idea of the last millennium. What follows are a few picks based upon some favorite categories which came to mind. We could invent as many categories as there are baseball statistics.

Perhaps one more should be on the list: "Most Accurately Located Survey Monument." If you know the answer to this question off the top of your head, you obviously appreciate that any surveying superlative, like the speed of light, is only relative.

1. *Most famous surveyor: George Washington*
2. *Best-known place named after a surveyor: Mt. Everest (Mt. Whitney is the equivalent in California)*
3. *Superlatives for surveying inventions:*
   Most important: theodolite
   Most popular: compass
   Most revolutionary: photogrammetry
   Most underrated: split-image optical rangefinder
   Cleverest: polar planimeter
   Fastest distance measurer: tacheometry (stadia)
   Most ingenious: Curta Calculator
4. *Greatest surveying scientist: Carl F. Gauss*
5. *Most useful unit of measure: Gunter's chain*
6. *Most outrageous surveying measurement: Transcontinental triangulation of planet Mars*
7. *Most successful conqueror to use surveying principles: Napoleon*
8. *Most significant academic paper: Method of Least Squares*
9. *Most difficult survey: Survey of India, 1840s*
10. *Most important scientific discovery to impact surveying science: Determination of the finite speed of light*
11. *Most erroneous scientific conclusion drawn from survey data: Theory of continental drift*
12. *Most erroneous scientific conclusion drawn from a lack of survey data: Columbus' discovery of "India"*
13. *Most important scientific conclusion drawn from survey data: Proof of flattening of the poles (comparison of length of meridians at different latitudes)*
14. *Most precise survey (for its day): Survey of India, 1840s*
15. *Most difficult surveying calculation: Lunar occultation*
16. *Most contested survey measurement: Elevation of Himalayas*
17. *Strangest word used in American surveying lexicon: thalweg*
18. *Most influential surveyor: Thomas Jefferson*
19. *Most important map: Oregon Trail*
20. *Biggest correction survey (boundary adjustment): Amended Gadsden Purchase (Arizona-Mexico border)*
21. *Most ambitious surveying project: US sectionalized land system*
22. *Longest survey line run: US-Canadian border*
23. *Most important invention to benefit surveying: radar*
24. *Riskiest survey: Powell expedition down the Green/Grand Rivers*

❖

Obituaries

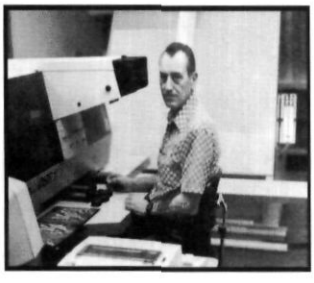
IN MEMORY OF ORVILLE B. BROWN

Orville B. Brown died quietly at his home in Quincy on Thursday, December 2, 1999 at the age of 90. He worked as a forester and surveyor for both private lumber companies and the U.S. Forest Service before retiring in 1977. As a youth in Arizona he worked at the Grand Canyon helping his father who was in charge of the mule pack team that went into the canyon, then later served with the U.S. Navy during World War II. Orville became extremely proficient at recovering old cadastral survey marks and maintained a Plumas National Forest wall map with colored pins indicating where he found corners. The map had over 3,000 of his pins at last count. He acquired the nickname O.B. after two surveyors came upon a remote corner after an extremely difficult access of climbing and crawling through thick timber and brush. Because they were so far into the rugged mountain country they thought they had found a point that had never been previously recovered. Upon finding one of Brown's K-tags one exclaimed "the (O)ld (B)astard's been here." O.B. was interested in old surveying equipment and other forest relics and supported public displays of these artifacts. He is a legend among his colleagues and friends and his thousands of K-tags throughout northeastern California stand as tiny sentinels to his many contributions to surveying.

Submitted by Bud Uzes

IN MEMORY OF ROBERT NUGENT

When Bob Nugent died in February, our profession lost a pioneer.



Photogrammetry has seen monumental changes over the last century. Many of those advances came from contributions made by people who have a love of flying, of photography, and of cartography. Bob Nugent was one of those people. He helped shape the mapping industry.

Bob grew up in Gresham, Oregon. His childhood was a difficult one and he spent his early teens in an orphanage. In 1942, when he was just old enough to serve, Bob joined the Navy and became part of a submarine crew during world War II. He came out of the war with TB. Once he recovered, he got a commercial pilots license, but also spent time as a sheriff and a professional race car driver. Later, he lamented that it was easy to understand why he had such a hard time getting life insurance.

In the late fifties, Bob stumbled into photogrammetry as a trainee. He experienced all aspects of the profession - flying, aerial photography, surveying and stereo-compilation. In 1963, he was licensed by the State of California as a Photogrammetric Surveyor. A few years later he mapped 27,000 acres of marshland in Florida. The area is better known today as Disney World. He took on mapping jobs in Guatemala, Alaska, Panama, Costa Rica and various parts of the U.S.

Bob remained an avid pilot even after three airplane crashes. One of them, caused by engine failure, came over the swamps of Guatemala. It brought his plane down with 1313 engine hours on the Hobbs meter. Thirteen stitches later, Bob was back in business.

In 1973, Bob help found Mission Aerial Photo, part of Rick Engineering Company in San Diego. For the next 17 years, until 1990, he served as Photogrammetrist-in-Charge. He was crusty and opinionated, but to those who know him well, he was also charming and giving. His experience and knowledge paved the way for Mission Aerial's advancement in the areas of analytical photogrammetry, aerotriangulation and orthophotography. Wayne Brown, and old friend and co-worker, said, in the small world of photogrammetry, it seems as if everyone over 40 knew Bob Nugent.

Bob passed away on February 12, 2000, at the age of 74. He is survived by his son Rusty.

Submitted by Jas Arnold, PLS

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Here's Some Important Information About CLSA

The goal of the California Land Surveyors Association is to promote and enhance the profession of surveying, to promote the common good and welfare of its members, to promote and maintain the highest possible standards of professional ethics and practice, and to elevate the public's understanding of our profession. CLSA represents all Land Surveyors, whether they are employees or proprietors, whether in public or the private sector.

Representation

■ LOCAL: Your local chapter represents you in local issues. Through your chapter representative to the State Board of Directors, the individual member can direct the course CLSA will take. ■ STATE: The Surveyor is represented at the state level through an active legislative program, legislative advocate, and liaison with the State Board of Registration. ■ REGIONAL: CLSA is an active member of the Western Federation of Professional Surveyors. This Federation is composed of associations throughout the western United States and addresses regional issues. ■ NATIONAL: Through institutional affiliation with the National Society of Professional Surveyors and the American Congress on Surveying and Mapping, CLSA is represented at the national level.

Education Opportunities

CLSA presents annual conferences which provide technical and business programs, as well as exhibits of the latest in surveying and computing technology. Seminars and workshops are presented to assist in continuing education. CLSA publishes the California Surveyor magazine and the CLSA NEWS to keep the membership abreast of changing legislation, legal opinions, and other items which affect our profession.

Business and Professional Services

CLSA provides a fully staffed central office which is available to answer questions or to provide up-to-date referrals concerning legislation, educational opportunities, job opportunities, or other issues concerning our membership. Professional liability insurance programs are available to members.

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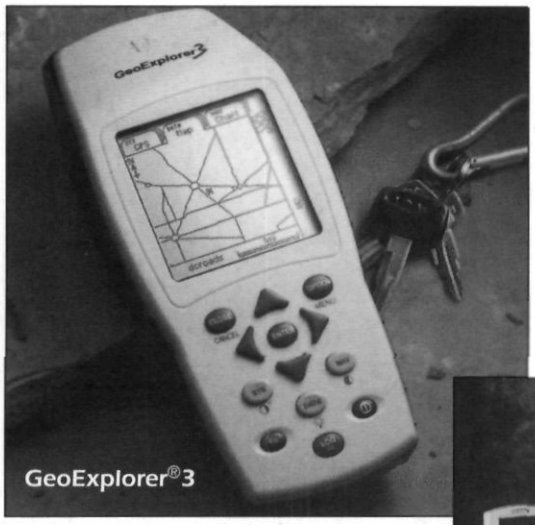

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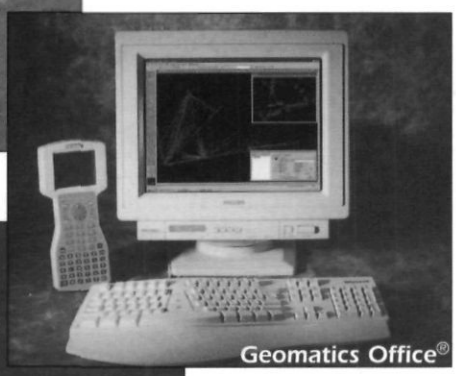

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